

WHAT IS CLAIMED:

1. 1. A fluent control valve comprising:
  2. a housing having an upper end that includes an inlet port and a valve plenum,
  3. and a longitudinal axis that extends from said upper end to said lower end;
  4. a fluid-control plate having a fluid-control surface (FCS) with a central control region and an FCS outer perimeter, said fluid-control plate being assembled in an upper portion of said housing;
  7. a nozzle having a nozzle plate at an upper nozzle end and a nozzle inlet with an inlet perimeter, and a discharge end with a nozzle exit, said nozzle being assembled in a lower portion of said housing;
  10. wherein said nozzle plate has a flat nozzle inflow surface and a nozzle outer perimeter;
  12. wherein said nozzle inflow surface defines a valve plane and said FCS has a slight valve angle relative to a plane that is parallel to said valve plane;
  14. wherein said fluid-control plate and said nozzle plate are translatable relative to one another along said longitudinal axis, so as to open and close a flowpath from said plenum through said nozzle;
  17. wherein said slight valve angle on said fluid-control plate provides an inflow space between said FCS at said FCS outer perimeter and said nozzle inflow surface at said nozzle outer perimeter when said throat region is closed.
1. 2. The fluent control valve of claim 1, wherein said nozzle inlet is a circular orifice and said inlet perimeter has a radiused nozzle-inlet edge, and wherein said nozzle has nozzle walls that flare outwardly between said nozzle inlet and said nozzle exit.
1. 4. The fluent control valve of claim 1 further comprising a flowpath from said nozzle outer perimeter across said nozzle inflow surface into said nozzle inlet, wherein said flowpath includes a fluid pintle that is hydrodynamically variable and that forms adjacent to said central control region of said FCS, wherein said fluid pintle increases and

5 decreases in size as a function of a fluid flow through said nozzle inlet, and wherein said  
6 fluid pintle provides a high pressure flow control barrier that redirects said fluid flow from  
7 a first flow direction that is parallel to said valve plane to a second flow direction that is  
8 approximately along said longitudinal axis toward said nozzle exit.

1 5. The fluent control valve of claim 4, wherein said flow control barrier is a dynamic  
2 high pressure fluid barrier.

1 6. The fluent control valve of claim 5, wherein said fluid pintle comprises a high-  
2 pressure region that deepens downward into said nozzle from said central control  
3 region of said FCS.

1 7. The fluent control valve of claim 6, wherein said flowpath is essentially free of  
2 obstruction by a solid construct.

1 8. A fluent control system for supersonic flow, said system comprising:  
2 said fluent control valve (FCV) of claim 1; and  
3 a hydrodynamic fluid pintle having a variable shape;  
4 a throat region that is formable between said FCS and said nozzle inflow surface  
5 upstream from said nozzle inlet radius;  
6 wherein said flowpath is adaptable for said supersonic flow, said throat region  
7 providing a transition region for significantly reducing a physical property of a fluid from  
8 a high level to a lower level before said fluid reaches said nozzle inlet and said radiused  
9 nozzle-inlet edge; and  
10 wherein said variable shape of said hydrodynamic fluid pintle adapts to an  
11 opening or closing of said FCV and provides a fluid-fluid control barrier for re-directing  
12 said flowpath toward said nozzle exit.

1 9. The fluent control system of claim 8, wherein said physical property is  
2 temperature.

1 10. The fluent control system of claim 8, wherein said physical property is pressure.

1    11. The fluent control system of claim 8, wherein a radius of said nozzle inlet is  
2    dimensioned to minimize fluid losses and heat transfer in said nozzle.